USSR/ Physical Chemistry - Molecule. Chemical bond

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 10826 B-4

It is possible that relative maxima of π-electron density are present at other points of benzene ring (for example near ortho- or meta-positions to substituent). Summative density of electrons near both ortho- or both meta-positions, according to the authors, may be greater than density in para-position, which must have a substantial role in analysis of kinetic problems. General propositions advanced by the authors are illustrated in the case of chlorobenzene calculations performed by T.N. Rekasheva (RZhKhim, 1956, 9018) in which the potential well, associated with substituent, was considered rectangular in the case of infinitely great height of barrier at the side of substituent.

Card 2/2

Bochvar, D. A.

AUTHORS: Bochvar, D. A., Stankevich, I. V., Chistyakov, A. L. 62-11-27/29

TITLE: On the Relationship Between the Electron-Gas Method and the Molecular Orbit Method (K sootnosheniyu mezhdu metodom elektronnogo gaza i metodom molekulyarnykh orbit)

PERIODICAL: Izvestiya AN SSSR, Otdel.Khim.Nauk, 1957, Nr 11, pp. 1414-1414 (USSR)

ABSTRACT: This is a letter to the editor. It is shown that instead of the usually applied formula:

$$\frac{d^2\Psi(x)}{dx^2} + \frac{2m}{\hbar} E\,\Psi(x) = 0 \qquad (1)$$

a much more common equation

$$\frac{d^2\Psi(x)}{dx^2} + Ak\Psi(x) = 0 \qquad (2)$$

can be applied.

That is to say, with the same boundary conditions, where A is a parameter, which is at our disposal. By this equation an oscillation system can easily combined, where a certain point $x(C_i)$ is opposed to the i.atom C. If the distance between the adjacent C-atoms is equal, the p.coefficient of the j.linear combination of the molecular orbits methods becomes equal to the value of the j.equation (2) in the point $x(C_p)$. If the distance is different,

Card 1/2

On the Relationship Between the Electron-Gas Method and the Molecular Orbit Method. 62-11-27/29

the solutions of the equation (2) permit to find approximated values for the coefficients of the linear combination of p_o-functions of the molecular-orbits method. It can be demonstrated that the difference between j+1 and j of the own values of the equation (2) approximately coincides with the difference between j+1 and j energy-level of the molecular-orbits method, if A is chosen in a corresponding manner. If it is chosen $A = \frac{\hbar^2}{2m}$, the equation (1) is obtained.

ASSOCIATION: Institute for Element-Organic Compounds of the AN USSR (Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR)

SUBMITTED: September 1o, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Bochvar, D. A., Stankevich, I. V., Chistyakov, A. L. SOV/62-58-6-31/37

TITLE: Letter to the Editor (Pis'ma redaktoru) Calculation of the Conjunction Energy in the S-Triphenyl-Cyclopropenyl Cation (Raschet energii sopryazheniya dlya S-trifeniltsiklopropenil-kationa)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 6, pp. 793-793 (USSR)

ABSTRACT: In connection with the statement made concerning the synthesis of the S-triphenyl-cyclopropenyl cation (Ref 1) the calculation of this compound was carried out by the LKAO MO-method in π-electron approximation. The authors proceeded from the following assumptions:
1) the σ-skeleton is flat and shows the symmetry group C_{3v})
2) all bond lengths are equal,
3) all Coulomb integrals are equal among themselves (equal to α),
4) all resonance integrals are equal (equal to β),
5) AO is passed over by overlapping integrals. Calculation

Card 1/3

Letter to the Editor. Calculation of the Conjunction Energy in the S-Triphenyl-Cyclopropenyl Cation

SOV/62-58-6-31/37

showed that a closed electron shell (in the sense of Khykkel) exists. 20π-electrons of the system take up 10 molecular orbitals corresponding to their energy (in ascending order):
$\alpha + 2{,}61\beta$, $\alpha + 2{,}06\beta$
$\alpha + 1{,}79\beta$, $\alpha + 1{,}15\beta$ (twofold degenerated level),
$\alpha + \beta$ (threefold degenerated level) and $\alpha + 0{,}76\beta$. For the compound discussed the conjunction energy (compared with the system of isolated binary bonds) is $9{,}16\beta$ and exceeds the sum of the conjunction energies in phenyl rings and in the cyclopropenyl cation by $1{,}16\beta$. There is 1 reference.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental-organic Compounds AS USSR)

SUBMITTED: February 26, 1958

Card 2/3

Letter to the Editor . Calculation of the Conjunction Energy in the S-Triphenyl-Cyclopropehyl Cation

SOV/62-58-6-31/37

1. Cyclic compounds--Properties 2. Cyclopropenyl ions--Energy 3. Mathematics 4. Perturbation theory

Card 3/3

5(4)

AUTHORS: Bochvar, D. A., Gambaryan, N. P., Stankevich, I. V., Chistyakov, A. L.

SOV/76-32-12-22/32

TITLE: A Qualitative Evaluation of the Stability of Heterocyclic Systems by Hueckel's Method of Approximation (O kachestvennoy otsenke ustoychivosti geterotsiklicheskikh sistem v ramkakh priblizheniya Gyukkelya)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 12, pp 2797 - 2802 (USSR)

ABSTRACT: E. Hueckel (Ref 1) used the words "closed electron shell" to explain the relative stability of cyclic ions. With molecules forming regular polygons of CH-groups, the first, not degenerate level is followed by several doubly degenerate levels. If these levels are gradually filled in with π-electrons, closed electron shells are formed for systems with 2, 6, 10, 14 .... π-electrons in accordance with Pauli's principle. When a CH-group is replaced by an atom other than a C-atom or when a substitution takes place, the energy change may be considered as being a disturbance which does not exert any influence on the closed shell. A study is made of the general stability of

the hepta-ring where a CH-group is replaced by a less electronegative group, in this special case by boron ("Borepin"). The secular determinant of the molecule is developed as a polynomial, the number of its positive and negative roots determined and the conjugation energy of the system calculated. This method can easily be applied to heterocyclic systems, if the numerical values of the parameters used in the secular equation are unknown. In some cases, however, a clear determination of the molecular tracks is impossible without definite parameter values. Calculations show that "Borepin" has a closed electron shell.
There are 3 tables and 2 references, 1 of which is Soviet.

ASSOCIATION: Akademiya nauk SSSR (Academy of Sciences, USSR)
Institut elementoorganicheskikh soyedineniy, Moskva
(Institute of Element-Organic Compounds, Moscow)

SUBMITTED: June 10, 1957

24(5) SOV/56-36-2-48/63

AUTHORS: Bochvar, D. A., Gambaryan, N. P., Stankevich, I. V., Chistyakov, A. L.

TITLE: On Some Properties of Symmetry of the Eigenfunctions of the Equation of Schrödinger (O nekotorykh svoystvakh simmetrii sobstvennykh funktsiy uravneniya Shredingera)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 2, pp 626-627 (USSR)

ABSTRACT: The present paper deals with 2 facts hitherto (according to the authors' opinion) not discussed in literature. 1) The symmetry groups of the eigenfunctions of the Schrödinger (Shredinger) equation are subgroups of the symmetry group G_H of the corresponding Hamiltonian $\hat{H}$. 2) The contrary of statement 1) is not true, i.e. there are no subgroups of the group G_H which are not symmetry groups of the eigenfunctions of a given Schrödinger equation. The proofs of the correctness of these 2 assertions are discussed step by step. The groups of the solutions of a Schrödinger equation with a total system of eigenfunctions consist of all the possible co-kernels of the symmetry

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SOV/56-36-2-48/63

On Some Properties of Symmetry of the Eigenfunctions of the Equation of Schrödinger

group of the Hamiltonian. There are 3 references, 1 of which is Soviet.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Element-Organic Compounds of the Academy of Sciences, USSR)

SUBMITTED: October 25, 1958

Card 2/2

BOCHVAR, D.A.

AUTHOR: Bochvar, D.A. 39-1-1/5

TITLE: On the problem of paradoxes and the problem of the extended calculus of predicates (K voprosu o paradoksakh i k probleme rasshirennogo ischisleniya predikatov)

PERIODICAL: "Matematicheskiy Sbornik" (Mathematical Symposium), 1957, Vol.42 (84), No.1, pp. 3-10 (U.S.S.R.)

ABSTRACT: The formalism K_0 (1) which is an extended calculus of variable predicates apart from the theory of types is taken as a starting point in the construction of an extended calculus of predicates, apart from the theory of types, but distributed by definite rules of individual predicates using "inversion" formulae containing free variables. At the foundation of such a construction is placed the representation of the existence of different relations of belonging (ε = relations) between predicates and objects while fully retaining the universal variables of a formalism. Such a point of view throws additional light on the nature of paradoxes. In addition, from this point of view, it is possible to study different orders of predicates distinguished in character by their relation of belonging between themselves and the corresponding objects. The author considers that here there arise problems which are not only mathematical, but of logical significance. From the

Card 1/2

On the problem of paradoxes and the problem of the extended calculus of predicates. (Cont.)

logical point of view, such a direction of investigation is more natural than, for example, the a priori distinction of sets and classes with the introduction of different types of variables which is a variant of a theory of types. Some possible lines of such a development of the formalism K_0 are described. First of all, the general attitude governing the investigation is described, then the character and sense of the transformation leading from the formalism K_0 to the extended calculus of predicates with correct inverse - a transformation which it would be natural to call a concretisation - is explained.

There are 2 Slavic references.

SUBMITTED: September 22, 1955

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Bochvar, D. A., Gambaryan, N. P. (Moscow)

S/076/60/034/03/002/038
B115/B016

TITLE: The Electron Gas Method and Determination of the Electronegativity Differences of Atoms

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 3, pp 505 - 509 (USSR)

TEXT: When calculating the electronegativity difference of atoms forming a conjugate molecular system by means of the electron gas method, this difference is usually expressed by the rectangular depression ΔU of the bottom of the potential well at the site corresponding to the hetero atom. Among others, M. G. Veselov and T. N. Rekasheva (Refs 1 - 3) dealt with this problem. In the present paper the authors made the attempt to use the electron gas method for determining the electronegativity difference of atoms forming biatomic molecules. The model of the molecule was represented by means of a step-potential well with finite walls (Fig 1,a), in which connection the depth of various sections of the well, corresponding to different atoms of the molecule, were to be determined on the strength of the ionization potential and the spectrum of the molecule. The carbon monoxide molecule was chosen as the model investigated, with preceding investigation of the applicability of the electron gas method to biatomic molecules with x-electrons by the example of the nitrogen molecule. By assuming a simple

potential well model for the nitrogen molecule its depth was determined from the ionization potential which is set equal to the distance of the upper level from the rim of the well (Fig 1b). The solution of the problem concerning a simple potential well with finite walls gives equations (1) and (2) between the energy levels ε, their distance from the bottom of the well $(U - \varepsilon)$, and its length L. Equation (2) gives a calculable number of roots all of which are in the range $(n - 1)\pi < y_n < n\pi$ (Fig 2). The values of the roots within the given ranges increase with monotone increasing equation coefficient (kL) (Fig 3). The equation (3) derived has a finite number of roots each of which lies in the above-mentioned range (Fig 4). The values of the roots within the ranges increase monotonically with increasing equation coefficient (wL) (Fig 5). The method used for the nitrogen molecule was also applied to the carbon monoxide molecule. On the basis of the investigation performed it may be stated summarizingly that the determination of the electronegativity difference of two atoms in bimolecular molecules with π-electrons from their ionization potential and the first electron transition by the potential well method seems theoretically possible, but has no practical importance since the difference to be determined is too sensitive to small changes in the initial energy values. There are 5 figures and 18 references,

The Electron Gas Method and Determination of the Electronegativity Differences of Atoms

S/076/60/034/03/002/038
B115/B016

5 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy (Institute of Elemental-organic Compounds)

SUBMITTED: March 21, 1958

Card 3/3

BOCHVAR, D.A. (Moskva)

Antinomies based on groups of definitions of predicates each of which separately is not contradictory. Mat. sbor. 52 no.1:641-646 S '60. (MIRA 13:9)
(Logic, Symbolic and mathematical)

S/020/60/135/005/015/043
B019/B067

24.4500

AUTHORS: Bochvar, D. A., Stankevich, I. V., and Chistyakov, A. L.

TITLE: Entropy of Localization and Extension in a Quantum Mechanical System

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 5, pp. 1095-1096

TEXT: In a previous paper (Ref. 1), the authors together with N. P. Gambaryan suggested the definition of delocalization of a particle in a steady state of a quantum mechanical system as entropy of localization which might be calculated by appropriate eigenfunctions of the system. If $\psi(x_1, y_1, z_1, \ldots, x_n, y_n, z_n)$ is the steady state of a system consisting of n particles, the probability density for the position of the i-th particle is $\Phi(\tau_i) = \int_{R_{3n-3}} |\psi|^2 d\tau_1 \ldots d\tau_{i-1} d\tau_{i+1} \ldots d\tau_n$, and the entropy of the localization $h_i = -\int_{R_3} \Phi(\tau_i) \log \Phi(\tau_i) d\tau_i$. Here, R with the

Card 1/3

Entropy of Localization and Extension in a Quantum Mechanical System

S/020/60/135/005/015/043
B019/B067

respective index denotes the space $d\tau_i = dx_i dy_i dz_i$, over which integration is made. In the present paper, a system is studied consisting of m + k particles. m particles (e.g., positive nuclei) are fixed in this system, k denotes the number of similar particles (e.g., electrons). The problem arises as to what degree this definition is connected with the concept of extension. The authors attempted to introduce a theoretical characteristic of extension into the quantum mechanical system considered here. They regard a coincidence of this quantum mechanical concept and the concept of space in the ordinary sense as necessary. It may then easily be demonstrated that with homogeneous distribution (constant density) in a given finite range D of the space R with a volume V_D (in the ordinary sense) the local entropy h which is determined by $h = -\int_D \rho \log_b \rho d\tau$ is $\log_b V_D$, i.e., $V_D = b^h$. In the following, the authors define the h-extension of particles in the quantum mechanical system (with given state) by $V_H = e^h$ volume units. It is found that the h-extension is independent of

Entropy of Localization and Extension in a Quantum Mechanical System

S/020/60/135/005/015/043
B019/B067

the base of the logarithm which proves the correctness of the definition. Finally, some examples are briefly discussed in which N. P. Gambaryan and E. S. Bogatova calculated the particle entropy in a potential well. There is 1 Soviet reference.

PRESENTED: June 29, 1960, by I. V. Obreimov, Academician

SUBMITTED: June 23, 1960

Card 3/3

BOCHVAR, D.A.; STANKEVICH, I.V.; CHISTYAKOV, A.L.

Conjugation energies of the phenylcyclopropenyl and diphenylcyclopropenyl cations. Zhur. fiz. khim. 34 no. 11:2543-2545 N '60. (MIRA 14:1)

1. Akademiya nauk SSSR, Institut elementoorganicheskikh soyedineniy.
(Cyclopropene) (Chemical bonds)

BOCHVAR, D.A.; STANKEVICH, I.V.; CHSTYAKOV, A.L.

Entropy of localization and expansion in a quantum mechanical system. Dokl. AN SSSR 135 no.5:1095-1096 D '60. (MIRA 13:12)

1. Predstavleno akademikom I.V. Obreimovym.
(Entropy) (Quantum theory)

BOCHVAR, D.A.; STANKEVICH, I.V.; CHISTYAKOV, A.L.

Conjugation energies of some boron-containing systems. Izv. AN SSSR Otd.khim.nauk no.12:2252-2253 D '61. (MIRA 14:11)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.
(Heterocyclic compounds) (Boron compounds)

BOCHVAR, D.A.; STANKEVICH, I.V.; CHISTYAKOV, A.L.

Symmetry of solutions in an eigenvalue problem. Usp.mat.nauk 16 no.3:155-158 My-Je '61. (MIRA 14:8)
(Eigenvalues) (Symmetric functions)

BOCHVAR, D.A.; CHISTYAKOV, A.L.

"Superfluous" elements of symmetry in solutions by the molecular orbital LCAO and electronic gas methods. Zhur. fiz. khim. 35 no.5:1162 My '61. (MIRA 16:7)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.
(Molecular rotation)

BOCHVAR, D.A.; STANKEVICH, I.V.; CHISTYAKOV, A.L.

Energy levels of really alternant systems. Zhur.fiz.khim. 35 no.6:1337-1342 Je '61. (MIRA 14:7)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.
(Hydrocarbons) (Molecules)

BOGHVAR, D. A.; STANKEVICH, I. V.; CHISTYAKOV, A. L.

Some integral characteristics of distributions applied to quantum-mechanical systems. Entropy of localization, extension, and degree of filling in a quantum-mechanical system. Zhur. fiz. khim. 36 no.12:2674-2679 D '62. (MIRA 16:1)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

(Quantum theory)

ACCESSION NR: AP3000119 S/0062/63/000/005/0785/0788

AUTHOR: Bochvar, D. A.; Bagatur'yants, A. A.

TITLE: Binding energy and comparative stability of borazole and some heterocyclic molecules containing B and N atoms

SOURCE: AN SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 5, 1963, 785-788

TOPIC TAGS: binding energy, borazole, heterocyclic B-N ring systems, molecular orbital method, linear combination atomic orbitals, conjugation

ABSTRACT: Proceeding from the results of Roothaan and Mulliken (J. Chem. Phys., 16, no. 2, p. 118, 1948), the authors calculated the binding energy of benzene and borazole by the molecular orbital method (linear combination of atomic orbitals) taking overlap into account. Binding energies were also calculated for molecules of the type shown in Enclosure 1. Binding energies for borazole were 1.80 and 0.96 eV; those for (1), 3.96 and 2.16 eV; those for (2) 1.24 and 0.34 eV; those for (3) 1.28 and 0.66 eV; and those for (4) 0.72 and 0.48 eV. In compound (1) the stabilization energy was 20 and 25% higher than for borazole. Of the 5-membered rings, (3) was the most stable because Pi-electrons can spread out in this molecule. Orig. art. has: 1 equation, 2 tables.

Card 1/3

ACCESSION NR: AP3000119

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute for Organoelemental Compounds, Academy of Sciences SSSR)

SUBMITTED: 25Jun62 DATE ACQ: 12Jun63 ENCL: 01

SUB CODE: CH. PH NO REF SOV: 000 OTHER: 002

Card 2/3

BOCHVAR, D.A.; STANKEVICH, I.V.; CHISTYAKOV, A.L.

Entropy terms as an expression of the uncertainty principle.
Dokl.AN SSSR 149 no.1:68-71 Mr '63. (MIRA 16:2)

1. Institut elementroorganicheskikh soyedineniy AN SSSR.
Predstavleno akademikom I.V.Obreimovym.
(Entropy) (Functional analysis)

BOCHVAR, D.A.; STANKEVICH, I.V.

Some consequences of symmetry for the eigenfunction sequence in the one electron problem in a potential field. Zhur. fiz. khim. 38 no.5:1324-1326 My '64. (MIRA 18:12)

1. Institut elementoorganicheskikh soyedineniy. Submitted June 27, 1963.

BOCHVAR, D.A.; SOSIN, S.L.; KORSHAK, V.V.; TUTKEVICH, A.V.; VASNEV, V.A.

Reaction of diisopropylphenyl borate with free radicals. Izv. AN SSSR Ser. khim. no.2:367-368 '65.

(MIRA 18:2)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

BOCHVAR, D.A.; BAGATUR'YANTS, A.A.

Electronic structure of sydnone and of some of its nitrogenous analogs. Zhur.fiz.khim. 39 no.7:1631-1635 Jl '65. (MIRA 18:8)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

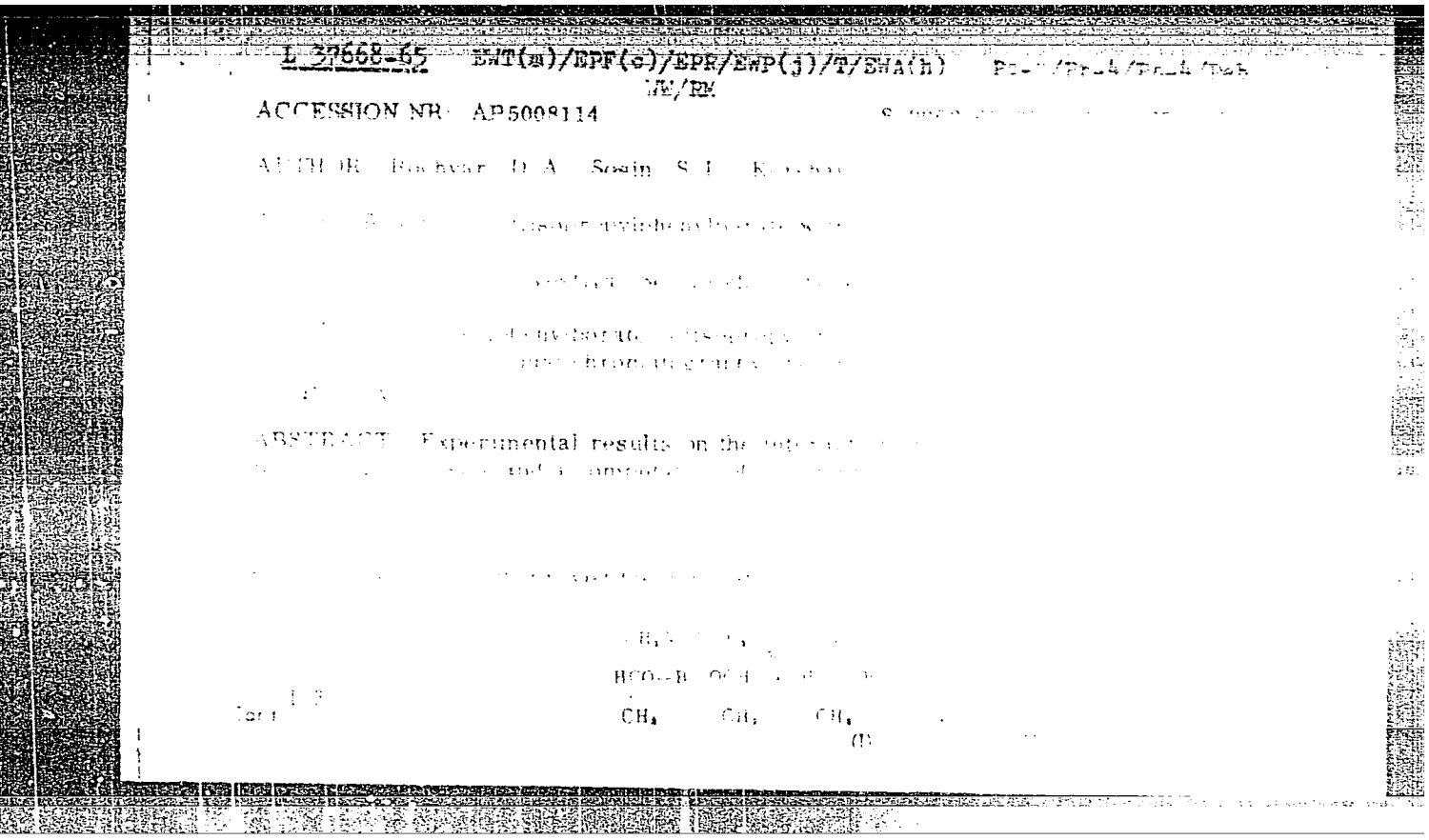
BOCHVAR, D.A.; STANKEVICH, I.V.

Molecular diagrams of really alternant systems. Zhur. fiz. khim. 39 no.8:2028-2030 Ag '65. (MIRA 18:9)

BOCHVAR, D.A.; STANKEVICH, I.V.; CHISTYAKOV, A.L.

Level diagrams of aza-boron alternant systems. Zhur. fiz. khim. 39 no.6:1365-1372 Je '65. (MIRA 18:11)

1. Institut elementoorganicheskikh soyedineniy AN SSSR. Submitted Jan. 4, 1964.



L 37668-65 EWT(m)/EPF(c)/EPR/EWP(j)/T/EWA(h) Pc-4/Pr-4/Pl-4 IJP(c)
MW/RM

ACCESSION NR: AP5008114

AUTHOR: Bashkov, O. A.; Sosin, S. I.; K[illegible]

ABSTRACT: Experimental results on the [illegible]

H_2S [illegible]

$HCO-R$ [illegible]

CH_4 CH_3 CH_2 [illegible]

(I)

L 37668-65

ACCESSION NR: AP5008114

[illegible] are probably formed by multiple [illegible]

[illegible]

3 formulas and 1 figure.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Heteroorganic Compounds, Academy of [illegible])

SUBMITTED: 15Jun64 ENCL: 01 SUB CODE:

NO REF SOV: 002 OTHER: 001

Card 2/3

L 37868-65

ACCESSION NR: AP5008114

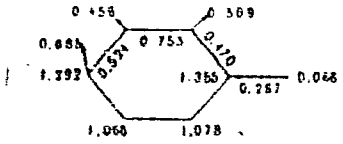


Fig. 1. Molecular diagram of the phenyl-boron R radical

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21120
S/149/61/000/003/003/004
A006/A106

1555, 1454, 4016

18 7500

AUTHORS: Dobatkin, V. I., Bochvar, G. A., Potapenko, Yu. I.

TITLE: Comparative investigation of properties of titanium alloy ingots and deformed work

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, no. 3, 1961, 120 - 124

TEXT: The main causes for the difference of properties in ingots and deformed work are defects of the cast structure. For titanium alloys, however, this difference may also be connected with peculiarities of phase recrystallization. The temperature of recrystallization annealing of titanium is considerably below the temperature of allotropic transformation. During the cooling of an ingot the alloy is inevitably in the β -range and, when passing into the $(\alpha+\beta)$ and the α -range, suffers phase recrystallization at a comparatively slow transformation rate. A deformed alloy, however, does not pass through the β-range during annealing. If pressure working is performed at the β -range temperature, phase recrystallization takes place in both the ingot and the deformed work, but at different transformation rates. The authors attempted to determine which of the aforementioned causes was

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Comparative investigation of properties of ...

decisive, by heating both cast and forged specimens to a β-range temperature and by subsequent slow or speeded-up cooling. Single and bi-phase alloys were prepared from Ti-0 (Tg0) and Ti-00(Tg00) sponge. (Composition see table). The content of impurities did not exceed 0.15% Fe, 0.11%Si, 0.07% C, 0.06% N. All the ingots were obtained by double vacuum melting in a water-cooled copper crystallizer. Rods of 12 - 15 mm diameter were forged with a deformation degree not less than 90%; forging was terminated at 800 - 850°C. The blanks were annealed at 750°C. Cast blanks were cut out of the rods on an anodic-mechanical saw. Specimens of 12 mm in diameter or 12 x 6 mm section were heat-treated as follows: heating to 1,100°C for 30 min; cooling with the furnace at 30 degrees per h to 600°C, or in water at 20°C with subsequent annealing at 750°C for one h. The specimens were then subjected to tensile and impact tests. The following reguliarities were stated in the change of properties: Ultimate strength of forged single-phase alloy specimens was by about 10 kg/mm^2 higher than that of ingots; the difference was 15 kg/mm^2 for bi-phase alloys. Ultimate strength of cast and forged specimens after heating to 1,100°C and slow cooling approached that of the ingot, and that of forged specimens after heating to 1,100°C and high-speed cooling. Elongation and contraction of the cross sections of single-phase alloys varied little, depending on the cooling conditions from the β-range; in forged specimens they exceed in all states the corresponding

Comparative investigation of properties of ...

values of cast specimens. Elongation, contraction and toughness of forged bi-phase alloy specimens are higher than those of ingots. After heating to 1,100°C and both slow or rapid cooling, the indicated characteristics approach those of an ingot. It can be concluded that the main cause for a reduced ductility of bi-phase alloy ingots is the fact of cooling them from the β-range i.e., beta embrittlement. The main cause for a reduced strength of single- and bi-phase alloy ingots is the low cooling rate during the transition through the bi-phase ($\alpha + \beta$) range. The effect of crystallization was less noticeable than that of phase recrystallization, because the defects in the ingots are not strongly developed due to the small range of the liquid-solid state in titanium ingots and low-alloyed titanium alloys. The main difference in the structure of cast and forged specimens treated at 1,100°C is the grain size, which is coarser in cast specimens. The internal structure of the grains in specimens cooled from 1,100°C does not depend on the preliminary treatment but on the cooling rate. The results obtained by the study show the possibility of obtaining the same strength in commercial titanium-alloy castings and in deformed work by proper heat treatment. On the other hand, the results obtained show reduced ductility values of ingots, in particular for bi-phase ($\alpha + \beta$) -alloys. Higher ductility and an optimum strength-ductility ratio in annealed state can not be obtained by deformation in the β-range but only by deformation in the bi-phase or the α -range.

Card 3/5

S/149/61/000/003/003/004
A006/A106

Comparative investigation of properties of ...

There are 3 tables and 2 figures

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals) Kafedra metallovedeniya (Department of Metal Science)

SUBMITTED: August 15, 1960

Table
Chemical composition and transformation temperature of the titanium alloys investigated

Alloy	Ingot diam. mm	Content. %					Transformation temperature $\beta \rightarrow \alpha + \beta$ °C
		Al	V	Mo	Sn	Fe	
BT1 (VT1)	120	-	-	-	-	-	-
BT 5 (VT5)	200	4.87	-	-	-	-	1000
BT5-1(VT5-1)	380	4.69	-	-	2.6	-	1000

Card4/5

21120

S/149/61/000/003/003/004
A006/A106

Comparative investigation of properties of ...

BT 6 (VT6)	380	5.13	4.07	-	-	-	970
BT 6 (VT6)	120	5.45	3.55	-	-	-	-
TiAlMo	120	5.35	-	2.69	-	-	-
TiAlMoFe	200	3.78	-	2.75	-	1.5	940

Card 5/5

S/762/61/000/000/009/029

AUTHORS: Chistyakov, Ye. P., Bochvar, G. A., Legkodukh, A. M.

TITLE: Determination of the crystallization interval of titanium alloys by means of vacuum etching in a variable temperature field.

SOURCE: Titan v promyshlennosti; sbornik statey. Ed. by S.G. Glazunov. Moscow, 1961, 107-111.

TEXT: The paper describes preliminary determinations by the authors, under the guidance of V.I. Dobatkin, of the solidus (S) temperature (T) of a number of Ti alloys by a high-temperature (HT) determination of the microstructure of a polished section in a vacuum. Determination of the liquidus (L) was made by the breaking-off of a drop from the end of the specimen. Binary Ti-Ni alloys (with up to 10% Ni), Ti-Mn alloys (up to 15% Mn) and several industrial Ti alloys were investigated. The tests were performed in a resistance-type TBB-2A (TVV-2A) vacuum furnace which exhibited vertical temperature variations, but only a small sectionwise T gradient. Tests were performed in a portion of the furnace cavity in which the T decreased linearly with height. The specimen was 170 mm long and had an 8-mm square section. One long face was ground to permit structural determination by vacuum etching. One tip was sharpened to a 20-mm long frustum of a cone. This specimen rod was suspended so that the sharpened tip hung down into the max-T zone, whereas the upper end reposed in the less hot upper region of the furnace. Three thermocouples covered the length of the rod. Vacuum: 10^{-4} to 10^{-5} mm Hg. The rod was

Card 1/2

"homogenized" at 1400-1500°C for 30 min, whereupon the furnace T was raised until a drop broke off the bottom cone (end of test). The T reading of the bottom thermocouple was taken to be the L T, an approximation which failed to take the surface tension into account and did not eliminate the possibility that a break-off of the drop at T's somewhat below the L T could occur in alloys that crystallize over a broad T interval. 70- to 100-x microscopic study of the cooled specimen, after vacuum etching, permitted determination of the S boundary from the inception of the grain-boundary disintegration or the appearance of the liquid phase within the grains. The distance between the S boundary on the specimen and the break-off point of the drop, plotted on the vertical T distribution in the furnace as obtained from the 3 sets of thermocouples on the rod, yielded the T at which the liquid phase first appears, i.e., the S T. Microstructural photographs of the various regions of a rod are shown. Test data obtained on systematic series of the above-cited Ti-Ni and Ti-Mn alloys are plotted versus %Ni and %Mn. The resulting curves are lower than those of H. Margolin and D.J.Maykuth (J. of Met., v.5, no.2, 1953) obtained in the graphite crucible which were less accurate in the determination of the appearance of the liquid phase and more susceptible to errors due to undesirable impurities. Similar S and L T determinations were performed and are tabulated for the alloys OT4, BT3-1 (VT3-1), BT5-1 (VT5-1), and BT6 (VT6). There are 4 figures, 1 (unnumbered) table, and the 1 English-language U.S. reference cited above.

ASSOCIATION: None given.

Card 2/2

DOBATKIN, V.I.; BOCHVAR, G.A.

High-temperature treatment of titanium alloys with an instable β-phase. Metalloved. i term. obr. met. no.2:59-62 F '63. (MIRA 16:3)

(Titanium alloys--Metallography)
(Metals, Effect of temperature on)

BOCHVAR, G.A.; CHISTYAKOV, Ye.P.

Certain characteristics of the structure and properties of cast titanium alloys. Issl. splav. tsvet. met. no.4:249-256 '63. (MIRA 16:8)

(Titanium alloys—Metallography)
(Titanium founding)

S/120/61/000/006/034/041
E194/E485

AUTHORS: Bochvar, I.A., Keirim-Markus, I.B.

TITLE: A heating device for investigating thermal luminescence

PERIODICAL: Pribory i tekhnika eksperimenta, no.6, 1961, 139-140

TITLE: This article describes equipment used in studying the thermal luminescence of glass in which disc shaped specimens weighing 1 to 2 g can be heated at a rate of 70°C per minute to a temperature of 350 to 400°C, measured by a thermocouple. The visible radiation is measured by a photo-electron multiplier type ФЭУ-29 (FEU-29) which has an amplification factor of 10^6. With the photo-cathode at a distance of 26 mm from the specimen, a cathode of 39 mm diameter observes 10% of the total solid angle and, because of reflection from a brass plate beneath the specimen, the proportion of solid angle actually recorded is greater than this. The equipment is screened and water cooled to avoid heating the photo-electron multiplier. There are 1 figure and 1 Soviet-bloc reference.

SUBMITTED: April 3, 1961

Card 1/1

BOCHVAR, I.A.; MARGULIS, U.Ya.

Perspectives of utilization of artificial radioactive isotopes in medical gammagraphy. Med.rad. 2 no.2:70-77 Mr-Ap '57. (MIRA 10:7)
(ISOTOPES,
artif.isotopes in gammagraphy (Rus))
(GAMMA RAYS,
same)

EPF(n)-2/EWP(q)/EWT(m)/BDS AFFTC/ASD/APGC/SSD Pu-4/
L 12361-63 Pq-4 WH/DM
ACCESSION NR: AP3003975 S/0089/63/015/001/0048/0052

74
73

AUTHOR: Bochvar, I. A.; Vasil'yeva, A. A.; Keirim-Markus, I. B.; Prosina, T. I; Syritskaya, Z. M.; Yakubik, V. V.

TITLE: Ionizing radiation dosimeters based on measurement of thermoluminescence of aluminophosphate glasses (IKS dosimeters)

SOURCE: Atomnaya energiya, v. 15, no. 1, 1963, 48-52

TOPIC TAGS: ionization dosimeter, aluminophosphate glass, Beta-radiation measurement, Gamma-radiation measurement, slow-neutron measurement, synchrocyclotron, high-energy proton, IKS dosimeter

ABSTRACT: Ionization dosimeters made of aluminophosphate-covered glass were developed for measuring β- and γ-radiation, slow neutrons, and high-energy charged particles in the range from 0.02 to (1-2)·10⁶ rads. The dosimeters operate on the following principle: the energy of ionizing radiation absorbed by the glass is stored in it in the form of light sum of the luminescence, which is emitted during heating of the glass and can then be recorded. The dosimeters are capable of accumulating and storing information over long periods, e.g., up to a month at 150C. While the dosimeter glass is not

Card 1/2

L 12861-63
ACCESSION NR: AP3003975

excited by daylight, an exposure of 40 days results in de-excitation of the stored light by 26—38%. The effective atomic number for the optimum composition of glasses is 11-13. A filter consisting of 0.6 mm Sn + 0.5 mm Al allows for compensation of the energy dependence at 40 Kev and above with an error of ± 20%. The dosimeter was tested using the synchrocyclotron of the Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research) with proton fluxes in the energy range of 100 to 500 Mev showed that the sensitivity of the detector glass to the tissue dose of high-energy protons coincides within 10% with the sensitivity of glass to γ-rays, indicating that the detector can be used for mixed p- and γ-radiation. Orig. art. has: 5 figures.

ASSOCIATION: none

SUBMITTED: 19May62 DATE ACQ: 08Aug63 ENCL: 00

SUB CODE: NS NO REF SOV: 002 OTHER: 007

Card 2/2

ACCESSION NR: AP4034803 S/0293/64/002/002/0304/0306

AUTHOR: Bochvar, I. A.; Vasil'yeva, A. A.; Keirim-Markus, I. B.; Prosina, T. I.; Sergeyeva, N. A.; Uspenskiy, L. N.

TITLE: Tissue dose of cosmic radiation received by V. F. Bykovskiy and V. V. Tereshkova during tandem orbital flight

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 2, 1964, 304-306

TOPIC TAGS: tandem flight, Vostok 5, Vostok 6, cosmic radiation, thermal neutrons.

ABSTRACT: Dosimetric readings taken during tandem orbital flights of the Vostok-5 (Bykovskiy) and the Vostok-6 (Tereshkova) show that the cosmic radiation doses absorbed by cosmonauts were 80 ±5 mrad and 44 ±5 mrad, respectively. Comparison of the above figures with measurements taken during preceeding flights show that the average intensity of the absorbed radiation was 0.65 mrad x hr^{-1} or 16 mrad x 24 hr^{-1}. The estimates of absorbed doses of thermal neutrons were $(1 \pm 15) \cdot 10^{-4}$ and $(7 \pm 15) \cdot 10^{-4}$ rem for the Vostok-5 and the Vostok-6, respectively. Therefor the respective fluxes of thermal neutrons were $(1 \pm 16) \cdot 10^{5}$ and

Card 1/2

ACCESSION NR: AP4034803

$(8 \pm 16) \cdot 10^5$ cm^{-2} while their densities were 0.2 ±4 and 3 ±7 $cm^{-2} \cdot sec^{-1}$, respectively. The radiation levels on the outer skin of the space capsules were approximately 2—3 times higher than inside the space ships.

ASSOCIATION: none

SUBMITTED: 14Oct63	DATE ACQ: 20May64	ENCL: 00
SUB CODE: AM	NO REF SOV: 004	OTHER: 002

Card 2/2

L 9882-66 EWP(e)/EWT(m)/EWP(b) DM/WH
ACC NR: AP6003965 SOURCE CODE: UR/0089/65/019/003/0311/0312

AUTHOR: Bochvar, I. A.; Keirim-Markus, I. B.; Moiseyev, A. A.; Prosina, T. I.; Yakubik, V. V.

ORG: none

TITLE: Measurement of the background external radiation exposure of the urban population in the USSR

SOURCE: Atomnaya energiya, v. 19, no. 3, 1965, 311-312

TOPIC TAGS: radiation dosimeter, gamma irradiation, radioactive contamination, man

ABSTRACT: Preliminary results are presented of the measurement of the background external exposure of small groups of people from 26 cities in the USSR. The studies were started in the second half of 1963. Individual dosimeters of the infrared spectroscopic type using thermoluminescent aluminophosphate glass were employed, allowing gamma doses from 0.02 to 2 X 10^6 rads to be measured. Ten people from each city wore the dosimeters continually for 167 to 325 days. The drop in instrument readings during the time of exposure was measured for control dosimeters. A table of results and error limits is given. Analysis of the data showed that the exposure levels depend largely on the type of rocks and soils in the cities; attempts to observe a correlation between exposure dose and latitude or height above sea level were unsuccesful. Orig. art. has: 1 table. [NA]

SUB CODE: 06 / SUBM DATE: 01Apr65 / ORIG REF: 002 / OTH REF: 004

Card 1/1 UDC: 539.16.04

FRIDLYANDER, I.N., doktor tekhn. nauk, red.; MATVEYEV, B.I., kand. tekhn. nauk, red.; BAZHENOV, M.F., inzh., retsenzent; BAL'SHIN, M.Yu., kand. tekhn. nauk, retsenzent; BOCHVAR, M.A., inzh., red.; VINOGRADSKAYA, S.I., red. izd-va; ORKSHKINA, V.I., tekhn. red.

[Heat-resistant material made of baked aluminum powder (SAP); a collection of articles] Teploprochnyi material iz spechennoi aliuminievoi pudry (SAP); sbornik statei. Pod red. I.N.Fridliandera i B.I.Matveeva. Moskva, Gos.nauchno-tekhn. izd-vo Oborongiz, 1961. 122 p. (MIRA 14:6)

(Aluminum) (Powder metallurgy)

SAMSONOV, Grigoriy Valentinovich; PORTNOY, Kim Isayevich; FRANTSEVICH, I.N., retsenzent; SKLYAROV, N.M., doktor tekhn. nauk, prof., retsenzent; BAL'SHIN, M.Yu., kand. tekhn. nauk, retsenzent; BOCHVAR, M.A., inzh., red.; VINOGRADSKAYA, S.I., red. izd-va; ROZHIN, V.P., tekhn. red.

[Alloys made of high-melting compounds] Splavy na osnove tugoplavkikh soedinenii. Moskva, Gos. nauchno-tekhn. izd-vo Oborongiz, 1961. 303 p. (MIRA 14:9)

1. Chlen-korrespondent AN USSR (for Frantsevich).
(Heat-resistant alloys) (Ceramic metals)

ALEKSEYENKO, Mikhail Fedorovich; VINAROV, S.M., doktr tekhn. nauk, prof., retsenzent; BOCHVAR, M.A., inzh., red.; KUNYAVSKAYA, T.M., red.izd-va; ORESHKINA, V.I., tekhn. red.

[Structure and properties of heat resistant, structural and stainless steels] Struktura i svoistva teplostoikikh konstruktsionnykh i nerzhaveiushchikh stalei. Moskva, Gos. nauchno-tekhn. izd-vo Oborongiz, 1962. 215 p. (MIRA 15:3)
(Steel)

S/123/62/000/023/004/008
A004/A101

AUTHORS: Sviderskaya, Z. A., Barsukova, T. A., Kuz'mina, V. I., Bochvar, N.R.

TITLE: The properties of aluminum alloys containing lithium

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 23, 1962, 17, abstract 23A122 (In collection: "Issled. splavov tsvetn. metallov". 3. Moscow, AN SSSR, 1962, 75 - 85)

TEXT: The authors present the results of investigating the effect of Li-additions (2 - 3%) on the properties of binary, ternary and more complex aluminum alloys. It is shown that, if the Li-concentration is increased to 2 - 3%, the strength characteristics of Al-Cu-Li alloys decrease with a simultaneous drop of elongation. The addition of Mn to these alloys increases both the strength and the elongation. Alloys containing Mn possess best properties at elevated temperatures. Thus the long-life strength σ_{100} of Al-alloys containing 4% Cu, 2% Li and 0.6% Mn amounts to 13 kg/mm^2 at 250°C. There are 18 references.

[Abstracter's note: Complete translation]

Card 1/1

ACCESSION NR: AP4039264 S/0078/64/009/006/1397/1402

AUTHOR: Drits, M. Ye.; Kadaner, E. S.; Padezhnova, Ye. M.; Bochvar, N. R.

TITLE: Determination of the boundaries of mutual solubility of manganese and cadmium in solid aluminum

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 6, 1964, 1397-1402

TOPIC TAGS: aluminum, cadmium, manganese, aluminum alloys, phase equilibria, electric properties, microstructure, solubility, mutual solubility

ABSTRACT: A small amount of cadmium in aluminum alloys has an extremely beneficial effect on the mechanical as well as the corrosion properties of the alloy. Consequently, in recent years cadmium is used as an alloying element in aluminum alloys which are used under deformation conditions, specifically in the refractory alloy of the system Al-Cu-Li-Mn-Cd. In order to determine the nature of the strengthening of cadmium containing aluminum alloys it is necessary to have data on the nature of the interaction of cadmium with aluminum and other alloying components. This work was concerned with the determination of the mutual solubility of cadmium and manganese in solid aluminum. In this investigation binary and ternary alloys

Card 1/3

ACCESSION NR: AP4039264

were prepared containing up to 2 % of manganese and up to 1 % of cadmium. The determination of the solubility was conducted by the microscopic analysis method of the faces of specimens which were subjected to preliminary electrolytic polishing and measurement of electrical systems. The solubility of cadmium and manganese in aluminum is shown in figure 1. Orig. art. has: 4 tables and 4 figures.

ASSOCIATION: None

SUBMITTED: 04Jul62 ENCL: 01

SUB CODE: MM NO REF SOV: 002 OTHER: 013

Card 2/3

ACCESSION NR: AP4039264 ENCLOSURE: 01

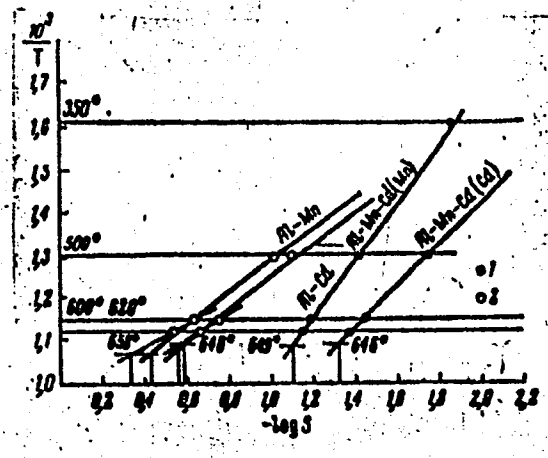


Fig. 1. Solubility of manganese and cadmium in aluminum: 1- Cd; 2- Mn. T is the absolute temperature and S is the maximum concentration of the dissolved element expressed in at. percent.

Card 3/3

BOCHVAR, O.S.

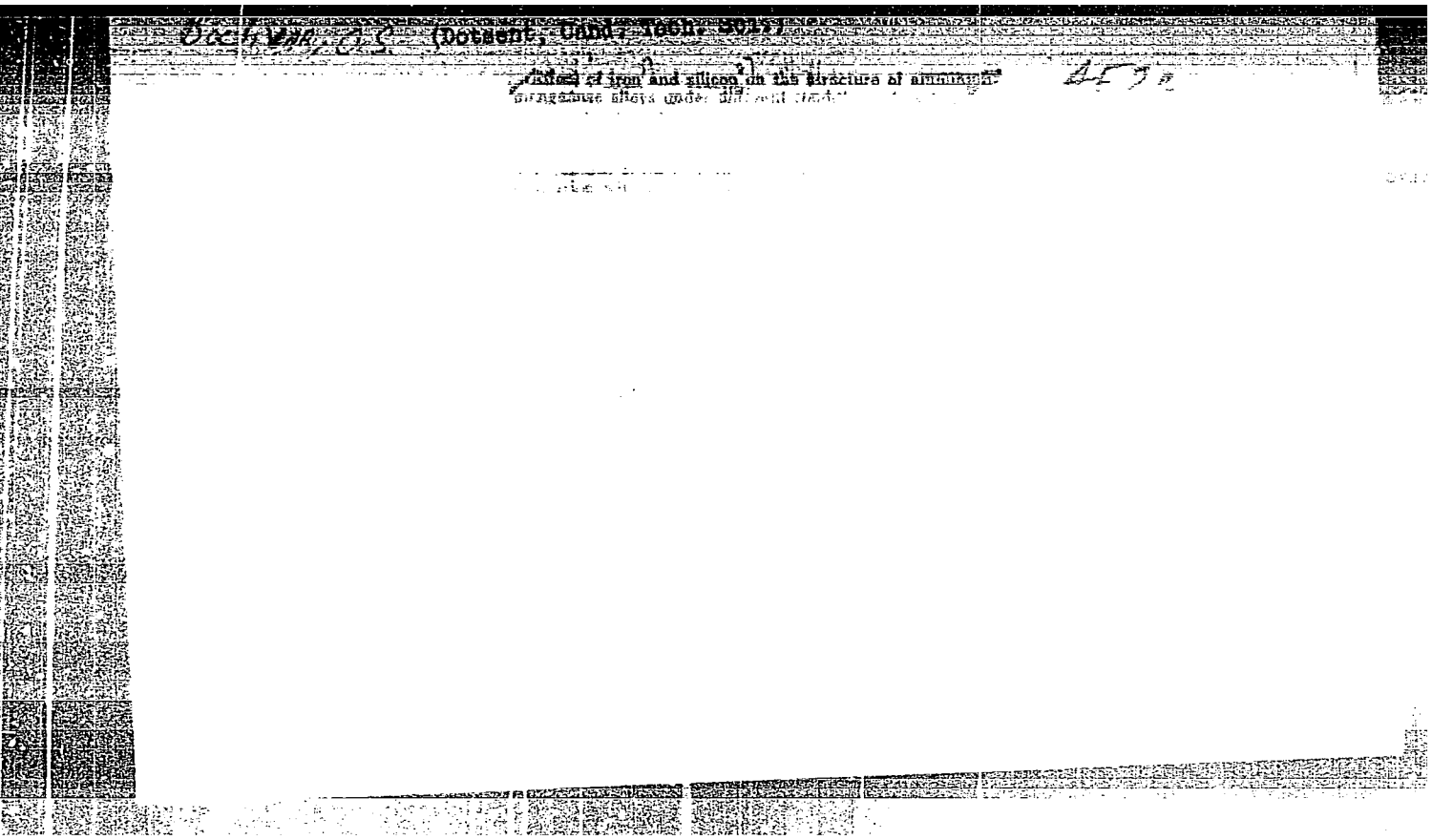
"Research on the methods of preparing micro sections for testing micro-hardness " pp. 49 of the monograph "Microhardness", Acad. Sci. U.S.S.R., 1951

BOCHVAR, O. S.

"Application of the Microhardness Method to the Solution of Certain Problems in Metallography." Sub 30 Jan 51, Moscow Aviation Technological Inst.

Dissertations presented for science and engineering degrees in Moscow during 1951.

SO: Sum. No. 480, 9 May 55.



S/689/61/000/000/021/030
D205/D303

AUTHORS: Bochvar, O.S., and Pokhodayev, K.S.

TITLE: The mechanical properties of wire and rivets of the M40 (M40) alloy

SOURCE: Fridlyander, I.N., V.I. Dobatkin, and Ye.D. Zakharov, eds. Deformiruyemyye alyuminiyevyye splavy; sbornik statey, Moscow, 1961, 158 - 163

TEXT: It was shown that only accelerated ageing can strengthen the M40 alloy, while natural ageing had no influence on the mechanical properties. This alloy also possesses a high plasticity. The mentioned properties make it suitable for rivetting material. The present work is concerned with the evaluation of this suitability. It was preliminarily established that the best mechanical properties are obtained after hardening from 480 - 510°C, after 15 minutes heating. Technological tests of 1000 rivets made of the alloy have shown that they have good technological properties in all states: non-hardened,

Card 1/2

S/689/61/000/000/021/030
D205/D303

The mechanical properties of wire ...

hardened and naturally aged. The best schedule of the thermal treatment is hardening from 510°C into cold water. The good mechanical properties for rivetting are preserved at 250°C. There are 6 tables.

Card 2/2

1.2300

S/536/61/000/050/014/017
D217/D304

AUTHORS: Bochvar, O.S., and Pokhodayev, K.S., Candidates of ~~Technical Sciences~~, Docents

TITLE: Influence of type of welding material used in hand argon arc welding on the properties of welds made in the alloy M40

SOURCE: Moscow. Aviatsionnyy tekhnologicheskiy institut. Trudy, no. 50, 1961, Voprosy metallovedeniya, 147-155

TEXT: Difficulties occasionally arise in the hand welding of structures made of the thermally strengthened alloy M40. They consist in the fact that on straightening complex, rigid welded structures, having a large number of crossing and parallel joins, cracking occurs in the zone in which the basis metal was melted. M40 wire was used as the welding material for the operation. Welding of this material was carried out under the direction of V.A. Pokrovskiy. In order to prevent crack formation during

Card 1/3

Influence of type of welding ...

straightening, welding conditions have to be chosen, under which the plasticity of the welded joint should increase without subsequent heat treatment. This problem was solved by the choice of a new welding material which increases the plasticity of the join without diminishing the strength. The alloys AMts (AMTs), AMg5 (AMg5) and AMg 6 (AMg6) were tested as weld materials. The structure and strength of the welded joins were investigated. It was found that the welded join exhibited high strength under all conditions of testing. The use of alloys AMg5 and AMg6 as weld materials results in practically identical strength both at room and at elevated temperatures. As compared with automatic welding, hand welding gives a U.T.S. of 2-3 kg/mm^2 less at all temperatures investigated. The application of alloys AMts, AMg5 and AMg6 as weld materials considerably increased the angle, through which welded joins made in alloy M40 can be bent. Peening of the welded join on straightening the specimens reduces the angle of bend somewhat. It is concluded that the angle of bend, as well as the U.T.S. at room temperature is determined not by the width of the molten zone, but by the degree to which the

1.2300

S/536/61/000/050/015/017
D217/D304

AUTHORS: Bochvar, O.S. and Pokhodayev, K.S., Candidates of Technical Sciences, Docents

TITLE: Influence of the conditions of automatic argon arc welding on the properties of welds made of the alloy M40

SOURCE: Moscow. Aviatsionnyy tekhnologicheskiy institut. Trudy, no. 50, 1961, Voprosy metallovedeniya, 156-164

TEXT: In this article, the results of investigating the structure and properties of welded joins made by automatic argon arc welding, using alloys M40 and AMg 6 (AMg6) as weld material, are reported. The specimens were welded after full heat treatment, (quenching from 500°C and ageing at 150°C for 10 hours). The material was tested in two states, as quenched and aged (M40-T1) and as cold worked after quenching (M40-TN1). Automatic argon arc welding was carried out with M40, using AMg6 alloy welding rods. The structure and strength of the latter at room

Card 1/3

Influence of the conditions ...

temperature and the strength of M40 alloy at elevated temperatures were investigated. The influence of temporary heating on the strength of the welding material at room temperature, and the plasticity of the components welded by automatic argon arc welding was studied. It was found that on welding the alloy M40, structural changes in the cold worked zone lead to the formation of two weakened portions, these being the zones, in which alloying occurs between the basis metal and the weld metal. Other portions were also weakened as a result of high temperature tempering in the zone of thermal influence. The weakened portions determine the strength of the welded joint. At room temperature the strength of the join is limited by the zone, in which alloying has occurred, and at 200-250°C it is limited by the other weakened portions. The strength of the welded join at room temperature is 34-36 kg/mm^2, which is 80-90% of the strength of the artificially aged basis material. Cold-worked sheets of M40 alloy in the welded condition have the same strength as undeformed sheet. At elevated temperatures (200-300°C), the strength of the welded join attains that of the undeformed basis material. Heating for up to 10 hours does not noticeably change the strength of

Card 2/3

BOCHVAR, O.S.; POKHODAYEV, K.S.

Constitutional diagram of the system Al - Cu - Cd. Issl. splav. tsvet. met. no.3:93-97 '62. (MIRA 15:8)
(Aluminum-copper-cadmium alloys—Metallography)
(Phase rule and equilibrium)

S/806/62/000/003/008/018

AUTHORS: Bochvar, O.S., Pokhadayev, K.S.

TITLE: On the phase diagram of the Al-Cu-Cd system.

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniye splavov tsvetnykh metallov. no.3. 1962, 93-97.

TEXT: The paper reports on experimental thermal and metallographic analysis work on the ternary Al-Cu-Cd system in the Al-rich region on which no other literature is available. The binary Al-Cu and Cd-Cu systems exhibit homogeneous liquids at any component concentration, but contain several chemical compounds each in the solid phase. The Al-Cd system forms two mutually nonmiscible liquids over a broad range of concentrations. Cu and Cd enter into solid solution with Al; no information is available on the solubility of Al in Cd. The tests showed that the region of nonmiscibility of two different liquid solutions in the ternary system Al-Cu-Cd prevails with Cu concentrations up to 50%. The system admits a pseudo-binary θ-Cd section, and all alloys contained within the Al-Cd-θ triangle have 3 solid phases; an α-Al solid solution and a θ solid solution based on the compound $CuAl_2$, and one on Cd. The alloys of the pseudobinary θ-Cd section have a broad region of liquid-phase stratification, and the crystallization process is accompanied by monotectic decomposition. The existence of the pseudobinary section appears to be a consequence of

Card 1/2

On the phase diagram of the Al-Cu-Cd system. S/806/62/000/003/008/018

the peculiarities of the θ-phase formation in the two-component system Al-Cu. The θ phase forms by peritectic reaction at 591°C. The peculiarity of that reaction consists in the near-identity of the composition of the liquid and of the θ crystals formed, as a result whereof an alloy with 53.5% Cu crystallizes at constant T to form a θ phase. With less than 52.5% Cu, a θ phase which behaves like an independent component is separated directly, whereas at higher Cu contents crystallization commences with the precipitation of primary η crystals which are always present in the alloy structure as excess crystals. Thermal analysis has shown that in alloys of the pseudobinary θ-Cd section a monotectic decomposition occurs at 588°C according to the reaction:

$$L_{3.85 \pm 0.15\%Cd} \rightleftarrows \theta + L_{2(Cd)}$$

In alloys of the Al-Cd-θ triangle a four-phase monotectic transformation occurs at 543° according to the reaction:

$$L^{2.8 \pm 0.2\%\ Cd}_{32.8 \pm 0.2\%\ Cu} \rightleftarrows \alpha\ \theta + L_{2(Cd)}$$

There are 4 figures (microphotos and phase diagrams) and 8 references (1 Russian-language Soviet, 1 German, and 6 English-language).
ASSOCIATION: None given.
Card 2/2

BOCHVAR, O.S. (Moskva); EKHINA, Ye.V. (Moskva)

Nature of the feathered structure of ingots of industrial aluminum.
Izv. AN SSSR. Met. no.5:124-133 S-O '65.
(MIRA 18:10)

BOCHVAR, O.S. (Moskva); POKHODAYEV, K.S. (Moskva); BADAYEV, V.G. (Moskva)

Effect of cyclic heat treatment on the irreversible shape changing of a VAD23 alloy sheet material. Izv. AN SSSR. Met. no.6:92-96 N-D '65. (MIRA 19:1)

1. Submitted July 29, 1965.

L 29793-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD/GD/JH

ACC NR: AT6016412 (A) SOURCE CODE: UR/0000/65/000/000/0070/0077

39
B+1

AUTHORS: Bochvar, O. S.; Pokhodayev, K. S.

ORG: none

TITLE: Crystallization process and phase composition of alloys of the system aluminum-copper-lithium

SOURCE: AN SSSR. Institut metallurgii. Metallovedeniye legkikh splavov (Metallography of light alloys). Moscow, Izd-vo Nauka, 1965, 70-77

TOPIC TAGS: alloy phase diagram, aluminum alloy, crystallization, copper alloy, lithium alloy

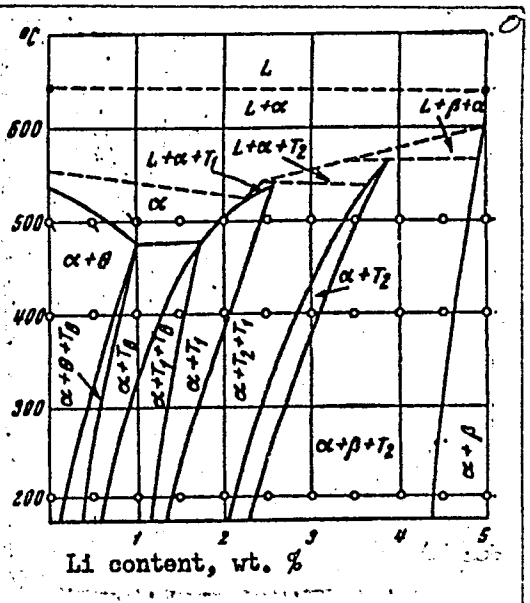
ABSTRACT: The phase composition of the system Al—Cu—Li in the high Al concentration region was determined. The phase diagrams were determined on the basis of cooling curves and microstructural analysis, and the experimental results are shown graphically (see Fig. 1). In addition to the phase θ and β, there exist three tertiary phases: T_B, T_1, and T_2 in the Al—Cu—Li system which are formed as the result of peritectic reactions.

Card 1/2

L 29793-66

ACC NR: AT6016412

Fig. 1. Vertical cross section of the diagram Al--Cu--Li for a constant Al composition of 95%. (Variables, Cu and Li).



Orig. art. has: 1 table and 6 figures.

SUB CODE: 11/ SUBM DATE: 16Sep65/ ORIG REF: 003/ OTH REF: 002

Card 2/2

L 29799-66 EWT(m)/EWP(t)/ETI IJP(c) JD/GD

ACC NR: AT6016414 (A) SOURCE CODE: UR/0000/65/000/000/0088/0092

AUTHORS: Bochvar, O. S.; Pokhodayev, K. S. 34

ORG: none B+1

TITLE: Solubility of copper and cadmium in aluminum

SOURCE: AN SSSR. Institut metallurgii. Metallovedeniye legkikh splavov (Metallography of light alloys). Moscow, Izd-vo Nauka, 1965, 88-92

TOPIC TAGS: alloy phase diagram, aluminum containing alloy, copper containing alloy, cadmium containing alloy, solubility

ABSTRACT: The simultaneous solubility of copper and cadmium in aluminum was determined at 400, 500, and 530C. The solubility was determined on the basis of microstructural analysis and electrical conduction data. On the basis of the experimental data, the phase diagrams for the system at 400, 500, and 530C were determined (see Fig. 1). The simultaneous presence of copper and cadmium decreases their solubility in solid aluminum.

Card 1/2

L 29799-66

ACC NR: AT6016414

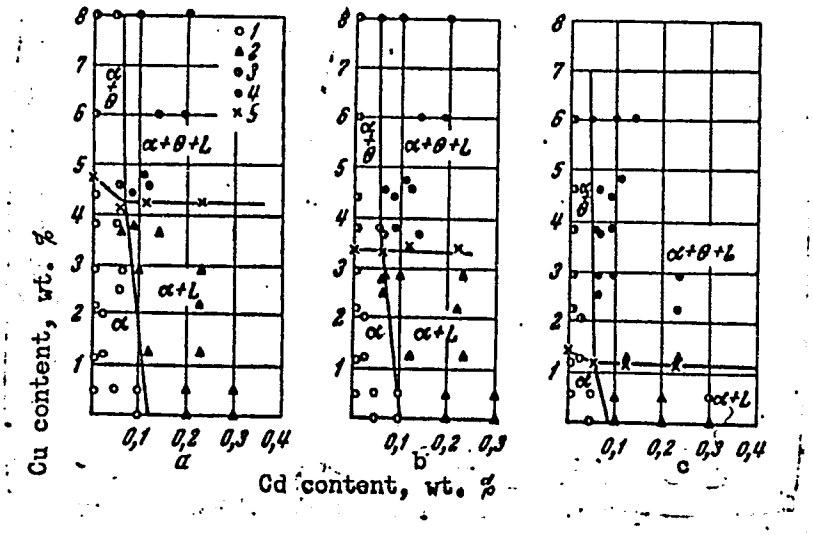


Fig. 1. Phase fields of the system Al - Cu - Cd at 530C (a), 500C (b), and 400C (c). 1 - α; 2 - α + L; 3 - α + θ; 4 - α + θ + L; 5 - electrical conduction data.

Orig. art. has: 1 table and 6 figures.

SUB CODE: 11/ SUBM DATE: 16Sep65/ ORIG REF: 004/ OTH REF: 002

Card 2/2

L 40330-66 EWT(m)/EWP(t)/ETI/EWP(k) IJP(c) JD/HW

ACC NR: AP6011114 SOURCE CODE: UR/0370/65/000/006/0092/0096

AUTHORS: Bochvar, O. S. (Moscow); Pokhodayev, K. S. (Moscow); Badayev, V. G. (Moscow)

ORG: none

TITLE: Effects of cyclic heat loads on irreversible geometric changes of alloy VAD23 sheet metal

SOURCE: AN SSSR. Izvestiya. Metally, no. 6, 1965, 92-96

TOPIC TAGS: metal property, electric conductivity, specific volume, metal heat treatment, metal aging, sheet metal / VAD23 sheet metal

ABSTRACT: The changes in geometry, electric conductivity, and specific volume as a function of thermal cycling of alloy VAD23 sheet metal were investigated and compared with "equivalent" steady-state heat-treated specimens and with specimens which had been artificially aged before testing. The specimens (100 x 35 x 3.3 mm) were heated from 20 to 150C in 60 seconds, cooled in water to 20C, and kept at 20C for 30 seconds before recycling. "Equivalent" heat treatment consisted of keeping the specimens at 150C for the same period of time which they spent at 140--150C during the cyclic loading. It was found that the longitudinal and lateral deformations increased with the number of cycles, reaching a maximum of 78 and 36 μ

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L 40330-66

ACC NR: AP6011114

respectively (8 and 9.5% elongation) after 2000 cycles and remaining constant thereafter. "Equivalent" heat treatment showed identical behavior but reached steady state after an "equivalent" 3000 cycles. The specific volume increased by a maximum of 0.248% after 2000 cycles and after an "equivalent" 1000 cycles. The electric conductivity continued increasing with number of cycles but increased faster for the "equivalent" treatment (a table is presented). It was found that artificial aging at 165C for 12 hours resulted in specimens which were unaffected by cyclic or "equivalent" heat treatment. Orig. art. has: 3 figures and 1 table.

SUB CODE: 11, 13/ SUBM DATE: 29Jul65/ ORIG REF: 009/ OTH REF: 001

Card 2/2 MCP

ACC NR: AT6036421 SOURCE CODE: UR/2536/66/000/066/0123/0127

AUTHOR: Bochvar, O S. (Doctor of technical sciences); Pokhodayev, K. S. (Candidate of technical sciences); Badayev, V. G. (Engineer)

ORG: none

TITLE: Cross section of the constitution diagram of the Al-Cu-Cd-Mn system with fixed Mn content at 500°C

SOURCE: Moscow. Aviatsionnyy tekhnologicheskiy institut. Trudy, no. 66, 1966. Struktura i svoystva aviatsionnykh staley i splavov (Structure and properties of aircraft steels and alloys), 123-127

TOPIC TAGS: alloy phase diagram, quaternary alloy, aluminum base alloy, copper containing alloy, cadmium containing alloy, manganese containing alloy

ABSTRACT: The isothermal model of the four-component constitution diagram of the Al-Cu-Cd-Mn system (Fig. 1) represents a tetrahedron whose apices correspond to 100% content of the system's components and edges and sides represent isothermal sections of the corresponding two- and three-component systems. Alloys containing the same amount of Mn

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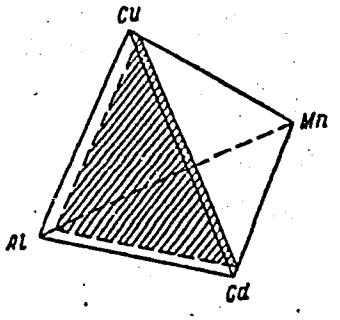

Fig. 1. Isothermal model of the constitutuion diagram of the Al-Cu--Cd-Mn system

correspond to the geometrical locus of points located within the tetrahedron and equidistant from the Al-Cu-Cd side. Such a geometrical locus is represented by a plane parallel to this side (In Fig. 1 this plane is indicated by the hatched area). The article deals with the phase competition and structure of alloys of the aluminum corner of the Al-Cu-Cd-Mn system at 500°C and given a fixed content of Mn (0.7%). Alloys containing up to 8.0% Cu and up to 0.5% Cd were investigated, on being prepared by adding Al-Cu and Al-Mn alloys and pure Cd to molten Al and casting this mixture into massive copper chill molds at 720°C, homogenizing

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Electric conductivity λ $\frac{m}{ohm\text{-}mm^2}$ (1 gradation = 1 $\frac{m}{ohm\text{-}mm^2}$

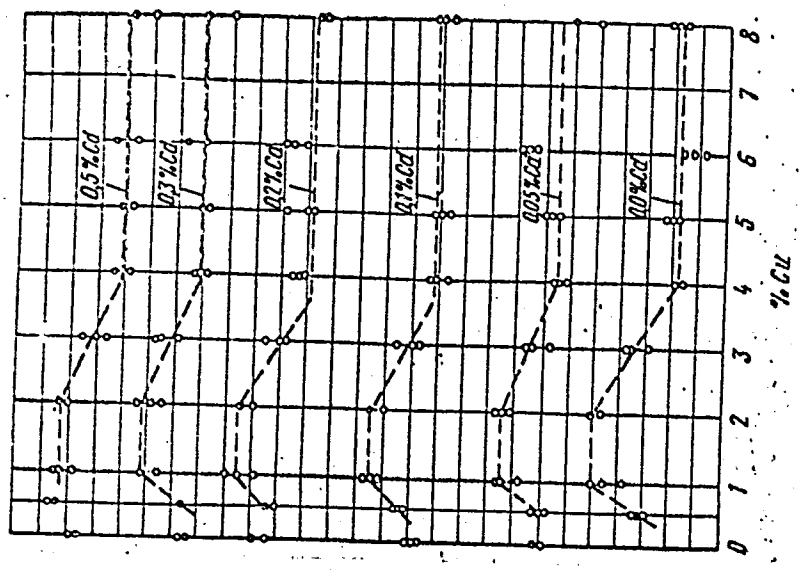

Fig. 2. Electric conductivity of alloys as a function of Cu content (all alloys contain 0.7% Mn)

Card 3/6

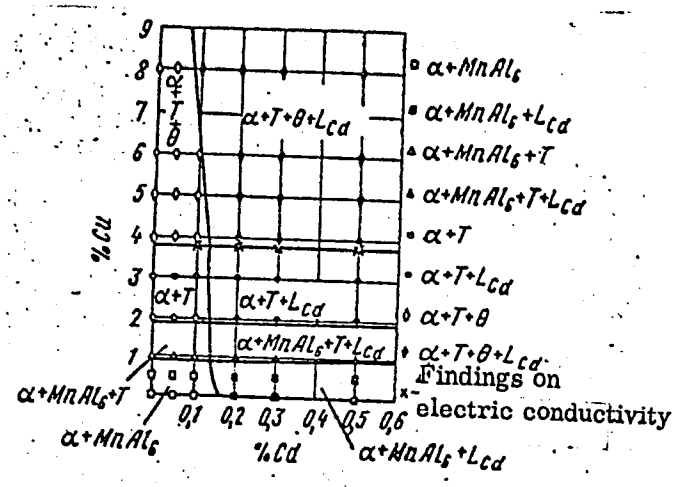

Fig. 3. Sectional diagram of the isothermal model of the constitution diagram of the Al-Cu-Cd-Mn system at 500°C and in the presence of a fixed Mn content (0.7%)

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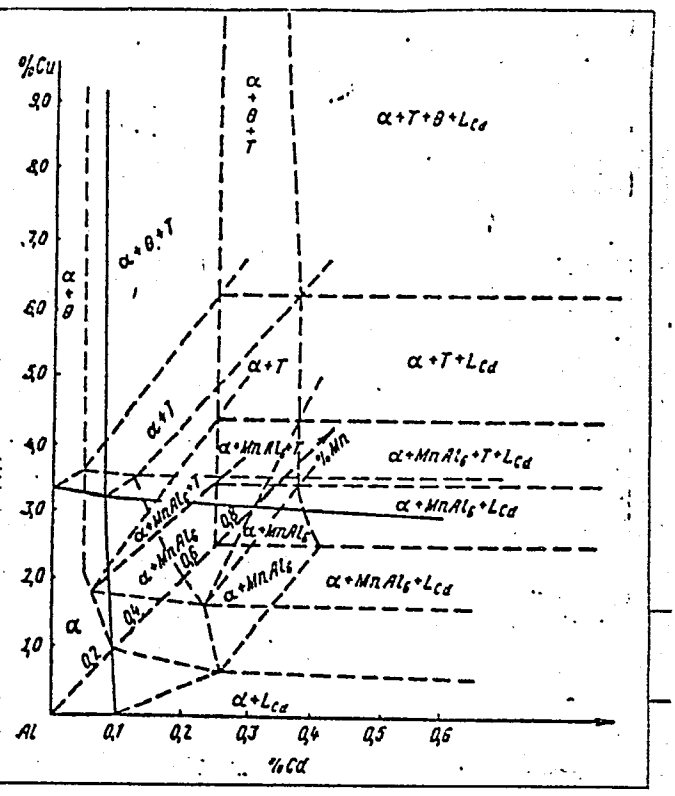

Fig. 4. Isothermal model of the Al corner of the Al-Cu-Cd-Mn constitution diagram at 500°C

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ACC NR: AT6036421

and hot-working the ingots and quenching them from 500°C in water, and subjecting specimen sections to metallographic and microstructural examination as well as to measurements of their electric conductivity. It was found that the solubility limit of Cd in Al in the presence of 0.7% Mn is 0.1-0.2% when the Cu content is up to 6.0%, and 0.05-0.1% when the Cu content is 8.0%. These findings are in good agreement with the findings on electric conductivity as a function of Cu content (Fig. 2), and the position of the phase regions in the sectional diagram of the isothermal model of the constitution diagram (Fig. 3) is in complete accord with Gibbs' law. On the basis of these findings and literature data the isothermal model of the aluminum corner of the constitution diagram of Al-Cu-Cd-Mn was plotted (Fig. 4): the spatial position of phase regions in this model also completely obeys Gibbs' law and is in agreement with literature data, and the sectional diagram plotted above (Fig. 2) is in satisfactory accord with the isothermal model of the system. Orig. art. has: 5 figures.

SUB CODE: // / SUBM DATE: none/ ORIG REF: 002/ OTH REF: 003

Card 6/6

ACC NR: AT6036422 SOURCE CODE: UR/2536/66/000/066/0128/0135

AUTHOR: Bochvar, O. S. (Doctor of technical sciences); Badayev, V. G. (Engineer)

ORG: none

TITLE: Change in the hardness of alloys of the Al-Cu-Cd-Mn-Li system as a function of composition and aging regime

SOURCE: Moscow. Aviatsionnyy tekhnologicheskiy institut. Trudy, no. 66, 1966. Struktura i svoystva aviatsionnykh staley i splavov (Structure and properties of aircraft steels and alloys), 128-135

TOPIC TAGS: HARDNESS, COPPER CONTAINING ALLOY, CADMIUM CONTAINING ALLOY, metal aging, aluminum base alloy, manganese containing alloy, lithium containing alloy

ABSTRACT: Alloys of the Al-Cu-Cd-Mn-Li system have recently begun to come into wider use as the inclusion of Cd and Li in addition to the conventional components (Cu and Mn) increases the strength characteristics of these alloys and improves the stability of their properties at elevated temperatures. The addition of Cd, in particular, while ineffective with respect to the strength and elongation of alloys in annealed and freshly quenched state, markedly

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enhances the effect of artificial aging (by more than 8-10 kg/mm^2). In this connection, the hardness of these alloys was investigated as a function of their composition and of the duration of artificial aging at 165°C. Alloys with the following chemical composition were investigated: 0.5 and 1.0% Mn, 0.1, 0.2 and 0.3% Cd; 4.0, 5.0 and 6.0% Cu, with Al as the remainder. In addition, two lithium-containing alloys (chemical composition: 0.5% Mn, 0.1% Cd, 5.0% Cu, 1.5 and 2.5% Li, with Al as the remainder) were investigated. The heat treatment of the alloys consisted in quenching in water from 535°C and artificial aging at 165°C for 4, 12, 16 and 20 hr. Hardness was measured once every 4 hr with the aid of a TSh machine under a load of 250 kg. Findings: the optimal hardening (Brinell hardness H_B 75 kg/mm^2) is accomplished by 16-hr aging at 165°C of the alloy containing 4% Cu, 0.2% Cd, 0.5% Mn, with Al as the remainder. Increasing the Cu content above 4%, the Cd content above 0.2% and the Mn content above 0.5% reduces the post-aging hardening to 22 kg/mm^2. Tests of the Li-containing alloys showed that the alloy containing 1.5% Li is more prone to softening (H_B 34 kg/mm^2 after 20 hr of aging) than the alloy containing 2.5% Li (H_B 53 kg/mm^2 after 20 hr of aging), which is in agreement with Silcock's conclusion (Silcock, J. M. J. of the Institute of Metals, 1959-1960, vol. 88(8), April) that a high Li content restricts the softening of alloys aged at 165°C. Orig. art. has: 6 figures, 2 tables.

SUB CODE: 11 / SUBM DATE: none/ ORIG REF: 001/ OTH REF: 004

Card. 2/2

L 05128-67 EWT(m)/EWP(t)/ETI IJP(c) JD/HW/JG

ACC NR: AP6027738 SOURCE CODE: UR/0020/66/169/004/0884/0886

AUTHOR: Drits, M. Ye.; Bochvar, N. R.

35
B

ORG: Metallurgy Institute im. A. A. Baykov (Institut metallurgii)

TITLE: Determination of the limits of joint solubility of neodymium and nickel in solid magnesium

SOURCE: AN SSSR. Doklady, v. 169, no. 4, 1966, 884-886

TOPIC TAGS: neodymium, nickel, magnesium, solubility, alloy phase diagram

ABSTRACT: In order to determine the limits of joint solubility of neodymium and nickel in solid magnesium, isothermal sections of the Mg-Nd-Ni diagram were plotted at 430, 400 and 250° on the basis of microscopic and chemical analyses of the alloys and measurements of their electrical resistance. All the sections intersect six phase regions: a single-phase region of a solid solution of Nd and Ni in Mg, three two-phase regions $\alpha+Mg_9Nd$, $\alpha+X$ and $\alpha+Mg_2Ni$, and two three-phase regions $\alpha+Mg_9Nd+X$ and $\alpha+X+Mg_2Ni$. It was found that the introduction of Ni into Mg-Nd alloys decreases the solubility of Nd in Mg, whereas the introduction of Nd into Mg-Ni alloys leaves the solubility of Ni in Mg virtually unchanged. As the temperature drops, the relative positions of the phase regions change: the single- and two-phase regions narrow down, and the three-phase regions widen. From the microstructural studies, the separate and joint solubilities of Nd and Ni in solid magnesium were determined at 430, 400, and

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L 05128-67

ACC NR: AP6027738

250°C. The electrical resistance measurements confirmed the microstructural data. The paper was presented by Academician Sazhin, N. P., 13 Dec 65. Orig. art. has: 2 figures and 1 table.

SUB CODE: 11/ SUBM DATE: 10Dec65/ ORIG REF: 004/ OTH REF: 001

Card 2/2

L 44310-66 EWT(m)/EWP(t)/ETI IJP(c) JD/JG/JH

ACC NR: AP6019835 (A) SOURCE CODE: UR/0370/66/000/001/0149/0152

AUTHOR: Drits, M. Ye. (Moscow); Padezhnova, Ye. M. (Moscow); Bochvar, N. R. (Moscow)

ORG: none

TITLE: Constitution diagram of the Mg-Nd-Ni system in the Mg-rich region

SOURCE: AN SSSR. Izvestiya. Metally, no. 1, 1966, 149-152

TOPIC TAGS: phase analysis, ternary compound, magnesium base alloy, neodymium, nickel/ / FPK-55 thermal analyzer

ABSTRACT: Alloys of the Mg-Nd-Mn system containing small amounts of Ni display high mechanical properties at elevated temperatures. The elucidation of the role of Ni in strengthening the alloys of Mg with Nd and Mn as yet requires investigating the nature of the interaction between components in ternary (Mg-Nd-Mn, Mg-Nd-Ni and Mg-Mn-Ni) and quaternary (Mg-Nd-Mn-Ni) systems. In this connection, as well as considering that the constitution diagram of the Mg-Nd-Ni system in the Mg corner is as yet unknown, the article presents a diagram of the crystallization surface for this corner as based on the findings of thermal and microstructural analyses of Mg-Nd-Ni specimens specially melted in electric resistance furnaces

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under a layer of flux (55% LiCl and 45% KCl). The thermal analysis was carried out by plotting the heating and cooling curves with the aid of the FPK-55 thermal analyzer (heating and cooling rates both were ~2 deg/min). The investigation of the ternary diagram of Mg-Nd-Ni was commenced with two polythermic cross-sections for a fixed content of Mg (85 and 80% respectively) (Fig. 1) and it established that even minute additions of Ni to Mg-Nd alloys lead to the formation of a new ternary compound conditionally denoted as χ. In addition, it was possible to establish the presence of two new nonvariant transformations: peritectic at 468°C and eutectic at 455°C and to find that the phases Mg_9Nd, χ and Mg_2Ni are in an equilibrium with the Mg-base ternary solid solution. The plotted projection of the crystallization surfaces of the Mg-Nd-Ni system (Fig. 2) is such that the lines of the monovariant transformations e_1P and e_2E are drawn from the critical points of the binary system to the corresponding nonvariant points P and E across the compositions of the alloys present on the polythermic cross-sections at the points of contact between two-phase fields. The transformations taking place at these nonvariant points are described by the following scheme:

point P -- temperature 468°C -- $L_{29\%\ Nd,\ 13\%\ Ni} + Mg_9Nd \rightleftarrows a + \chi$

point E -- temperature 455°C -- $L_{26\%\ Nd,\ 17\%\ Ni} \rightleftarrows a + \chi + Mg_2Ni$

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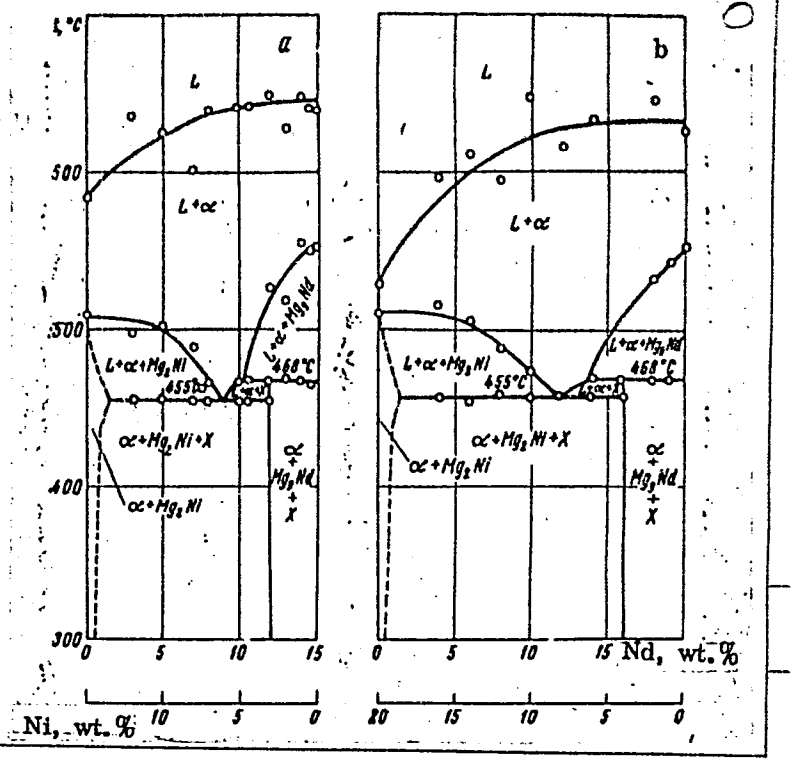

Fig. 1. Polythermic cross-sections of the Mg-Nd-Ni diagram with a fixed Mg content

(a - 85% mg; b - 80% Mg)

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L 44310-66

ACC NR: AP6019835

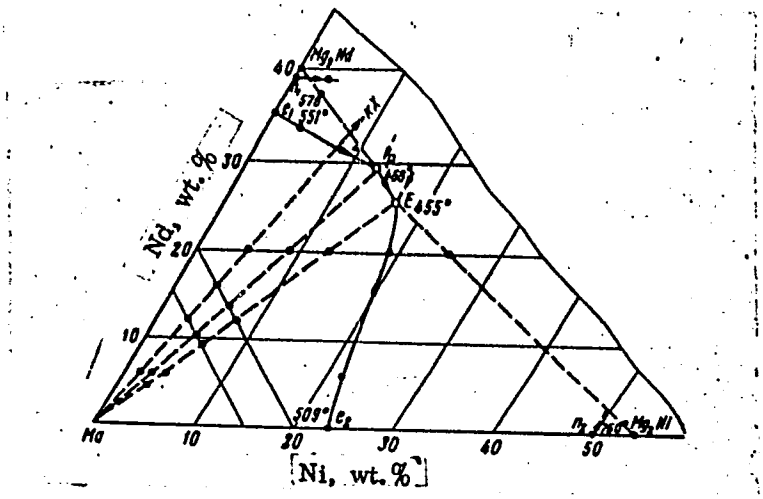

Fig. 2. Projection of the crystallization surfaces of the Mg-Nd-Ni diagram

Orig. art. has: 4 figures.

SUB CODE: 11, ~~20~~, 13/ SUBM DATE: 19Jun64/ ORIG REF: 004/ OTH REF: 002

Card 4/4 VLR

BOCHVAROV, Ivan, general-polkovnik

Like the granite of the Balkan Mountains. Starsh.-serzh. no.5:30 My '62. (MIRA 15:6)

(Bulgaria—Army)

S/029/60/000/009/008/008
B013/B060

AUTHORS: Bochvarov, N., Engineer, Khristov, V., Engineer (Bulgaria)

TITLE: Atomic Reactor in Bulgaria

PERIODICAL: Tekhnika molodezhi, 1960, No. 9, p. 30

TEXT: This is a contribution from Bulgaria on the activity of the Institute of Physics of the Bulgarian Academy of Sciences near Sofia. This institute, which was established ten years ago, is equipped with the most up-to-date apparatus, and its three main fields of activity are semiconductors, radioelectronics, and nuclear physics. The test reactor supplied by the Soviet Union forms the center of atomic research. A great deal of preliminary work is done to allow the reactor to be run under most efficient conditions. Several hot cells are attached to the reactor to produce certain radioactive isctopes needed in science, medicine, engineering, and agriculture. In addition to assisting Bulgaria in setting up the reactor and in working out experimental equipment, the USSR is helping in training qualified personnel. A large group of physicists, chemists, biologists, physicians, and other workers of the

Card 1/2

Atomic Reactor in Bulgaria

S/029/60/000/009/008/008
B013/B060

Institute have been taught in the USSR how to handle radioactive isotopes. Another group of physicists has previously worked at the Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) in Dubna. In 1959, Professor Ye. Dzhanov, head of the Chair of Applied Physics at the Physics and Mathematics Department of Sofia University and deputy director of the Physics Institute at the Bulgarian Academy of Sciences, was elected Vice President of the OIYaI. A group of management engineers and reactor physicists are already undergoing Soviet training for the second time. G. Nadzhakov, director of the Physics Institute, is mentioned. There are 2 figures.

Card 2/2

BOCHVAROV, N., inzh. (Bolgariya); KHRISTOV, V., inzh. (Bolgariya)

Atomic reactor in Bulgaria. Tekh.mol. 28 no.9:30 '60.
(MIRA 13:10)

(Bulgaria—Nuclear reactors)

GERASIMOV, Ye.A.; BOCHVAROV, S.Zh.

Forsterite and periclase-forsterite refractories with low porosity. Ogneupory 30 no.2:44-45 '65. (MIRA 18:3)

1. Sofiyskiy khimiko-tekhnologicheskiy institut, Narodnaya Respublika Bolgariya.

BOCHVAROVA, T.

LAMBREV, Zh., YANKOV, N., ADZHAROVA, Ye., BOCHVAROVA, T.

Antibacterial effects of certain higher fungi. Antibiotiki 3 no.1:56-58 Ja-F'58 (MIRA 11:5)

1. Kafedra biologii pri Vyasshem meditsinskom institute imeni I.P. Pavlova, Bolgariya Plovdiv.
(FUNGI,
antibiotic properties of higher forms (Rus))
(ANTIBIOTICS,
antibiotic properties of higher fungi (Rus))